

## CLAIMS

1. A cyclone system for disengaging solid and gaseous particles in FCC processes with reduced coke formation in disengager vessels comprising at least one legless cyclone 42 connected to at least one cyclone 47 in consecutive stages through concentric pipes 46a, 46b, wherein the system has a legless cyclone 42 fitted with at least one collector pipe 43 outside the cyclone 42.
2. The system of claim 1, wherein it reduces coke formation inside the disengager vessels without causing spent catalyst to be released inside the system.
3. The system of claim 1, wherein it maintains the overall efficiency of the disengagement and the integrity of the cyclones during run time.
4. The system of claim 1, wherein at least one collector pipe 43 is positioned outside to keep the spent and previously disengaged catalyst from being released into the cyclones in consecutive stages.
5. The system of claim 1, wherein at least one collector pipe 43 has a device of a suitable shape at its end to keep the spent and previously disengaged catalyst from being released into at least one cyclone 47 in consecutive stages.
6. The system of claim 1, wherein the connection between the pipes 46a, 46b that interconnect the cyclones in different and consecutive stages is fitted with a telescoping joint 45 with minimized annular space.
7. The system of claim 1, wherein as an alternative the connection between the pipes 46a, 46b interconnecting the cyclones in different and consecutive stages is fitted with a sealed telescoping joint.
8. The system of claim 1, wherein as an alternative the connection between the pipes 46a, 46b interconnecting the cyclones in different and consecutive stages has no telescoping joint.
9. The system of claim 1, wherein the lower nozzle of the legless cyclone 42 is fitted with distributors 42a of solids.
10. The system of claim 1, wherein the lower nozzle of the legless cyclone 42 has no distributors of solids.

11. The system of claim 1, wherein it comprises at least one flow distributor 46 between cyclones in the same stage.
12. The system of claim 1, wherein it comprises at least one flow distributor 46 between cyclones in different stages.
13. The system of claim 1, wherein it has no flow distributors 46 between cyclones in equal stages.
14. The system of claim 1, wherein it has no flow distributors 46 between cyclones in different stages.
15. The system of claim 1, wherein each stage comprises at least one external collector pipe 43.
16. The system of claim 1, wherein it comprises at least one purge liquid injector device 40.
17. A process for disengaging solid and gaseous particles in processes for the fluid catalytic cracking (FCC) of hydrocarbons, reducing coke formation in disengager vessels by using the system in accordance with claim 1, said process comprising the following steps:
  - a) feeding a suspension made up of cracking reaction products mixed with the catalyst in a closed cyclone disengaging system for fostering the disengaging of gaseous and particulate phases, with the gaseous current flowing into the fractionation system through an outlet duct 48;
  - b) collecting the particulate phase in the bottom of the disengager vessel 49, from where it flows to the rectification and regeneration zone;
  - c) purging the stagnated areas of the disengager vessel 49 by injecting purge liquid through the injector devices 40;
  - d) draining off the hydrocarbons recovered in the rectifier and the steam injected into the disengager vessel and the rectifier, said process comprising the following:
    - In stage d), the gases coming from the disengager vessel 49 are drained off through at least one collector pipe 43 outside the legless cyclone 42, avoiding the passage of hydrocarbons into the top of the disengager vessel, with its lower temperature;
    - In stage b), a minimum of the catalyst disengaged through the lower nozzle of the legless cyclone 42 is released by the gases drained off through the external collector pipes 43.

18. The process of claim 17, wherein at least one external collector pipe 43 captures the gases coming from the disengager vessel 49, in a location close to the lower nozzle of the legless cyclone 42, the pipe 43 rising outside of and parallel to the cyclone 42 and discharging the gases collected inside the pipes 46a, 46b.
19. The process of claim 17, wherein the annular space of the concentric pipes 46a, 46b allows for potential thermal expansion of the system.
20. The process of claim 17, wherein the telescoping joint 45 between the concentric pipes 46a, 46b allows for thermal expansion of the system.
21. The process of claim 17, wherein any commercially available expansion joint allows for thermal expansion of the system.
22. The process of claim 17, wherein the process minimizes the route taken by hydrocarbons coming from the rectifier in the disengager vessel 49 until being captured by the collector pipes 43 and carried to the piping with an outlet above the legless cyclone 42.
23. The process of claim 17, wherein the process minimizes access by the hydrocarbons coming from the rectifier in the area of the disengager vessel 49 with a lower temperature, which lies between the lower end of the legless cyclone 42 and the top of the disengager vessel 49, whereby coke formation is reduced.
24. The process of claim 17, wherein the hydrocarbons coming from the rectifier are collected in a warmer area of the disengager vessel 49, thus preventing coke from being deposited in said disengager vessel.
25. The device of claim 1, wherein the upper end of said external collector pipe 43 opens up into the pipes 46a, 46b, above the cyclone 42;
26. The device of claim 1, wherein said external collector pipe 43 points vertically downward;
27. The device of claim 1, wherein the lower end of said external collector pipe 43 opens up into the disengager vessel 49;
28. The device of claim 1, wherein said external collector pipe 43 allows for various shapes that prevent the release of catalyst into at least the cyclone 47 in consecutive stages.
29. The device of claim 24, wherein at least one collector pipe 43 is installed in such a way as to keep the spent and previously disengaged catalyst from being released into the cyclones in consecutive stages.